

- [12] S. Zhang, S. Zhang, and S. Zhang *et al.*, "Self-assembly of hydrophobic and self-healing bionanocomposite-coated controlled-release fertilizers," *ACS Appl. Mater. Interfaces*, vol. 12, no. 24, pp. 27598–27606, 2020.
- [13] R. Salihi, S. I. Abd Razak, and N. A. Zawawi *et al.*, "Citric acid: A green cross-linker of biomaterials for biomedical applications," *Eur. Polym. J.*, vol. 146, no. 11, 110271, 2021.
- [14] M. M. Hassan, N. Tucker, and M. J. L. Guen, "Thermal, mechanical and viscoelastic properties of citric acid-crosslinked starch/cellulose composite foams," *Carbohydr. Polym.*, vol. 230, 115675, 2020.
- [15] N. Kottegoda, C. Sandaruwan, and G. Priyadarshana *et al.*, "Urea-hydroxyapatite nanohybrids for slow release of nitrogen," *ACS Nano*, vol. 11, no. 2, pp. 1214–1221, 2017.
- [16] Y. Li, Y. Lv, M. Lian, F. Peng, and Y. Xiao, "Scientia horticulturae effects of combined glycine and urea fertilizer application on the photosynthesis, sucrose metabolism, and fruit development of peach," *Sci. Hortic. (Amsterdam)*, vol. 289, no. 1, 110504, 2021.
- [17] J. Jayanudin, R. S. D. Lestari, and I. Kustiningsih *et al.*, "Preparation of chitosan microspheres as carrier material to controlled release of urea fertilizer," *South African J. Chem. Eng.*, vol. 38, no. 8, pp. 70–77, 2021.
- [18] L. Wang, Y. Chi, K. Du, Z. Zhou, F. Wang, and Q. Huang, "Hydrothermal treatment of food waste for bio-fertilizer production: Formation and regulation of humus substances in hydrochar," *Sci. Total Environ.*, vol. 838, no. 3, 155900, 2022.
- [19] S. Wang, Y. Wu, and J. An *et al.*, "geobacter autogenically secretes fulvic acid to facilitate the dissimilated iron reduction and vivianite recovery," *Environ. Sci. Technol.*, vol. 54, no. 17, pp. 10850–10858, 2020.
- [20] F. Yang, and M. Antonietti, "The sleeping giant: A polymer view on humic matter in synthesis and applications," *Prog. Polym. Sci.*, vol. 100, 101182, 2020.
- [21] M. A. Islam, D. W. Morton, B. B. Johnson, and M. J. Angove, "Adsorption of humic and fulvic acids onto a range of adsorbents in aqueous systems, and their effect on the adsorption of other species: A review," *Sep. Purif. Technol.*, vol. 247, no. 1, 116949, 2020.
- [22] J. Li, X. Hao, M. C. M. V. Loosdrecht, Y. Luo, and D. Cao, "Effect of humic acids on batch anaerobic digestion of excess sludge," *Water Res.*, vol. 155, pp. 431–443, 2019.
- [23] F. Yang, S. Zhang, K. Cheng, and M. Antonietti, "A hydrothermal process to turn waste biomass into artificial fulvic and humic acids for soil remediation," *Sci. Total Environ.*, vol. 686, pp. 1140–1151, 2019.
- [24] L. I. Inisheva, S. G. Maslov, and K. E. Shchukina, "Biochemical activity of peat in the Ob region," *Solid Fuel Chem.*, vol. 52, no. 6, pp. 373–381, 2018.
- [25] J. O'Connor, S. A. Hoang, and L. Bradney *et al.*, "A review on the valorisation of food waste as a nutrient source and soil amendment," *Environ. Pollut.*, vol. 272, 115985, 2021.
- [26] X. Zhuang, H. Zhan, and Y. Song *et al.*, "Insights into the evolution of chemical structures in lignocellulose and non-lignocellulose biowastes during hydrothermal carbonization (HTC)," *Fuel*, vol. 236, no. 7, pp. 960–974, 2019.
- [27] S. A. A. Mohamed, M. El-Sakhawy, and M. A. M. El-Sakhawy, "Polysaccharides, protein and lipid-based natural edible films in food packaging: A review," *Carbohydr. Polym.*, vol. 238, no. 2, 116178, 2020.
- [28] M. Tabari, "Investigation of carboxymethyl cellulose (Cmc) on mechanical properties of cold water fish gelatin biodegradable edible films," *Foods*, vol. 6, no. 6, pp. 1–7, 2017.
- [29] X. Hu, Y. Liu, D. Zhu, Y. Jin, H. Jin, and L. Sheng, "Preparation and characterization of edible carboxymethyl cellulose films containing natural antibacterial agents: Lysozyme," *Food Chem.*, vol. 385, no. 3, 132708, 2022.
- [30] M. Michelin, A. M. Marques, L. M. Pastrana, J. A. Teixeira, and M. A. Cerqueira, "Carboxymethyl cellulose-based films: Effect of organosolv lignin incorporation on physicochemical and antioxidant properties," *J. Food Eng.*, vol. 285, no. 1, 2020.
- [31] M. Shahbazi, S. J. Ahmadi, A. Seif, and G. Rajabzadeh, "Carboxymethyl cellulose film modification through surface photocrosslinking and chemical crosslinking for food packaging applications," *Food Hydrocolloids*, vol. 61, pp. 378–389, 2016.
- [32] M. Yildirim-Yalcin, F. Tornuk, and O. S. Toker, "Recent advances in the improvement of carboxymethyl cellulose-based edible films," *Trends in Food Science and Technology*, vol. 129, no. 8, pp. 179–193, 2022.
- [33] C. R. Bauli, G. F. Lima, A. G. D. Souza, R. R. Ferreira, and D. S. Rosa, "Eco-friendly carboxymethyl cellulose hydrogels filled with nanocellulose or nanoclays for agriculture applications as soil conditioning and nutrient carrier and their impact on cucumber growing," *Colloids and Surfaces A: Physicochemical and Engineering Aspects*, vol. 623, no. 3, 126771, 2021.
- [34] V. S. Ghorpade, R. J. Dias, K. K. Mali, and S. I. Mulla, "Citric acid crosslinked carboxymethylcellulose-polyvinyl alcohol hydrogel films for extended release of water soluble basic drugs," *Journal of Drug Delivery Science and Technology*, vol. 52, no. 3, pp. 421–430, 2019.
- [35] D. Zhang, W. Xu, J. Cai, S. Y. Cheng, and W. P. Ding, "Citric acid-incorporated cellulose nanofibrous mats as food materials-based biosorbent for removal of hexavalent chromium from aqueous solutions," *International Journal of Biological Macromolecules*, vol. 149, pp. 459–466, 2020.
- [36] N. Habibi, "Spectrochimica acta part A: Molecular and Biomolecular Spectroscopy Preparation of biocompatible magnetite-carboxymethyl cellulose nanocomposite: Characterization of nanocomposite by FTIR, XRD, FESEM and TEM," *Spectrochim. ACTA PART A Mol. Biomol. Spectrosc.*, vol. 131, pp. 55–58, 2014.
- [37] Z. Jiao, B. Zhang, C. Li, W. Kuang, J. Zhang, and Y. Xiong, "Carboxymethyl cellulose-grafted graphene oxide for efficient antitumor drug delivery," *Nanotechnology Reviews*, vol. 7, no. 4, pp. 291–301, 2018.
- [38] A. J. Braihi, S. I. Salih, F. A. Hashem, and J. K. Ahmed, "Proposed cross-linking model for carboxymethyl cellulose / starch superabsorbent polymer blend," *International Journal of Materials Science and Applications*, vol. 3, no. 6, pp. 363–369, 2014.
- [39] S. Parvaneh, M. Pourmadadi, M. Abdouss, S. Ali, F. Yazdian, A. Rahdar, and A. M. Díez-pascual, "Carboxymethyl cellulose / starch / reduced graphene oxide composite as a pH-sensitive nanocarrier for curcumin drug delivery," *Int. J. Biol. Macromol.*, vol. 241, no. 11, 124566, 2023.
- [40] M. Salimi, B. Channab, A. El, and M. Zahouily, "A comprehensive review on starch: Structure, modification, and applications in slow / controlled-release fertilizers in agriculture," *Carbohydr. Polym.*, vol. 322, no. 8, 121326, 2023.

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